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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/583,386	05/30/2000	L. Richard Carley	000265	1365

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EXAMINER

KIELIN, ERIK J

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 12/16/2002

19

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/583,386

Applicant(s)

CARLEY, L. RICHARD

Examiner

Erik Kielin

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This action is in response to the RCE and Amendment E, filed 9 December 2002.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9 December 2002 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over EPO 0 624 900 A2 (**Sparks**) in view of US 5,578,976 (**Yao**).

Regarding claim 1, **Sparks**, a reference provided by Applicant in IDS filed 16 September 2002, discloses a method of fabricating a microstructure in a sealed cavity comprising,

providing a substrate **10** (Fig. 9a);

forming a microstructure **18** composed of a structural material **18** on said substrate, said microstructure being secured to said substrate by a first layer of sacrificial material **48** (Fig. 9a);

forming a second layer of sacrificial material **48** on said microstructure (Fig. 9a);

forming a cap **50** on said second layer of sacrificial material **48**, said cap forming a sealed cavity containing said microstructure and said first and second sacrificial layers (Fig. 9b);

forming one or more holes **52** in said sealed cavity, said holes being restricted to an area of said sealed cavity not directly above said microstructure (Fig. 9c);

introducing an oxygen plasma into said sealed cavity through said one or more holes **52**, said structural material and said sacrificial material having a high etch rate differential with respect to said etchant, such that said sacrificial material is removed (col. 10, lines 46-50); and

sealing said one or more holes in said sealed cavity (Fig. 9d).

(See associated text at col. 15, line 25 to col. 16, line 23.)

Regarding the oxygen plasma etching being performed using “a barrel etcher,” this limitation is not considered to have patentable weight because it has been held that to be entitled to weight in method claims, the recited structure limitations therein must affect the method in a manipulative sense, and not amount to the mere claiming of a use of a particular structure. *Ex parte Pfeiffer*, 1962, C.D. 408 (1961). In the instant case, the claim merely recites use of the structure. Moreover, it does not matter how the etchant is introduced so long as it is an oxygen plasma, an exemplary “non-liquid etchant,” to meet the criteria established by Applicant to meet the inventive value of eliminating a “liquid etchant.”

Sparks does not indicate that the cap **50** is formed of metal.

Yao teaches a method of forming a MEMS comprising providing a substrate **12**, sacrificial layers of photoresist **30, 38** (called “polyimide” in **Yao**; Figs 5A-6E) which secure the MEMS to the substrate until etched away, and structural material of aluminum **22, 24**. **Yao** also

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discloses that it is especially beneficial to use a barrel etcher with an oxygen plasma to remove the sacrificial layers in order to circumvent problems associated with surface tension created by wet etching. (See **Yao**, col. 5, lines 41-65 and especially col. 6, lines 6-13.)

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use the materials of **Yao** in the method of **Sparks** and thereby form the cap in **Sparks** of aluminum, because (1) **Sparks** is not limited to the materials from which the device is made, (2) both **Sparks** and **Yao** are making a cantilever microstructures, and **Yao** teaches that aluminum is also compatible with oxygen plasma during etching of sacrificial layers, and (4) the selection of a known material based on its suitability for its intended use is *prima facie* obvious. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co., Inc. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) (Claims to a printing ink comprising a solvent having the vapor pressure characteristics of butyl carbitol so that the ink would not dry at room temperature but would dry quickly upon heating were held invalid over a reference teaching a printing ink made with a different solvent that was nonvolatile at room temperature but highly volatile when heated in view of an article which taught the desired boiling point and vapor pressure characteristics of a solvent for printing inks and a catalog teaching the boiling point and vapor pressure characteristics of butyl carbitol. "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." 65 USPQ at 301.). See also *In re LESHIN*, 125 USPQ 416 (CCPA 1960). (See also MPEP 2144.07.)

Regarding claims 2, 21, and 22 it is seen to be inherent in each of **Sparks** and **Yao** that the etchant does not significantly etch the structural materials therein because the structures are shown to remain after the sacrificial material is etched away. Similarly, the etchant etches the sacrificial material faster and the structural material slower and the structural material is shown to be resistant to the etchant. Moreover, if these limitations were not met by **Sparks** and **Yao**, then no microstructure could effectively be formed in either invention, in direct contrast to what is shown in each.

Regarding claim 4, polyimide is a known photoresist material, so photoresist is implicitly disclosed in each of **Sparks** and **Yao**. “[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.” See *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968). See also *In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976).

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Sparks** in view of **Yao**, as applied to claim 1 above, and further in view of US 5,493,177 (**Muller** et al.).

While each **Sparks** and **Yao** disclose that the substrate is silicon, the protective silicon nitride layer formed on the silicon substrate does not appear to be disclosed therein.

Muller, a reference provided by Applicant and discussed in the instant specification at page 2, discloses a method of fabricating a microstructure in a sealed cavity. As noted by Applicant in the specification on page 2, regarding the **Muller** reference, the substrate is silicon with a protective silicon nitride layer 178 is formed thereon.

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It would have been obvious for one of ordinary skill in the art, at the time of the invention to apply a protect layer of silicon nitride to the silicon substrate of **Sparks** because **Muller** teaches that it provides protection to the silicon substrate during etching of a cavity, such etching of a cavity as has also been carried out in **Sparks**.

Response to Arguments

5. Applicant's arguments with respect to claims 1-4, 21, and 22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 703-306-5980. The examiner can normally be reached on 9:00 - 19:30 on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Erik Kielin
December 14, 2002